

## Understanding and Improving the Health of People Who Experience Incarceration: An Overview and Synthesis

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The world prison population is growing at a rate that exceeds the rate of population growth. This issue of *Epidemiologic Reviews* comprises articles in which researchers summarize what is known about some of the key health issues facing people in prison, particularly in relation to human immunodeficiency virus and other blood-borne viral infections. A key recurring theme is that addressing the health needs of people in prison is important to reducing health inequalities at the population level—that prisoner health is public health. The reviews also highlight some critical evidence gaps, notably the lack of evidence from low- and middle-income countries, and the limited number of longitudinal studies in which health behaviors, health outcomes, or health service experiences after release from prison are documented. Despite growing evidence of the poor health of detained adolescents, none of the included reviews considered this population. Further research on the health of young people who cycle through juvenile detention should be a priority. Despite a rapidly growing literature on the health of people who experience incarceration, some critical health issues remain poorly understood, and there has been insufficient attention devoted to co-occurring health conditions and the consequent need for coordinated care. Key populations in custodial settings remain understudied, limiting capacity to develop targeted, evidence-based responses to their health needs. The quality of many studies is suboptimal, and although rigorous, independent research in correctional settings can be challenging, it is not impossible and is critical to laying the groundwork for evidence-based reform.

global health; inequalities; prisoners; systematic review

Abbreviations: BBV, blood-borne virus; HCV, hepatitis C virus; HIV, human immunodeficiency virus; LMIC, low- and middle-income country; PNSP, prison needle and syringe program.

### INTRODUCTION

The global prison population exceeds 11 million people and is growing at a rate that exceeds population growth (1). Rates of incarceration vary dramatically around the world, from as low as 16 to as high as 799 per 100,000 persons. The United States, with an incarceration rate of 698 per 100,000 persons, accounts for 4.3% of the global population (1) but more than 1 in 5 of the world's prisoners. The annual "churn" through prisons greatly exceeds the daily number: The United Nations has estimated that annual prison throughput may be approximately 3 times the daily number (2), but there are insufficient data to produce reliable global estimates. Basic data on the size of the population cycling through prisons are a prerequisite for estimating the scale of the health burden concentrated in these settings (3).

People who cycle through prisons are distinguished by remarkably poor health profiles (4), including elevated rates of mental disorder (5), substance dependence (6), both communicable (7)

and noncommunicable (8) diseases, and intellectual disability (9). These myriad, co-occurring health problems often interact in a syndemic fashion (10) and are typically set against a backdrop of entrenched social disadvantage (11). In many settings, incarceration provides low-threshold access to health services for people who often face substantial barriers to accessing health care in the community. However, most people who are incarcerated spend a relatively short time in custody before returning to the community, such that prisoner health is public health (12). Because of the number of people who cycle through prisons each year globally, improving the health of this population is important to global health and to reducing health inequalities (13).

To achieve these outcomes, responses must be evidence based. Although there have been previous systematic reviews and meta-analyses of particular health conditions in this population, disease epidemics are not static, and the evidence base is growing rapidly. This issue of *Epidemiologic Reviews* is therefore both timely and

important. Although by no means a complete synthesis of the evidence, it provides a valuable summary of what is known in some key domains. Reflecting the primary studies on which the reviews are based, this special issue pays particular attention to infectious diseases, with half of the included reviews focusing on human immunodeficiency virus (HIV) and related infections.

## INFECTIOUS DISEASES IN PRISON

The prevalence of blood-borne viruses (BBVs), including HIV, hepatitis B, and hepatitis C (HCV), is disproportionately high among people who cycle through prisons. One reason for this is that people who experience incarceration are also more likely to engage in risk behaviors for these infections, including injection drug use, unprotected sex, and unsterile tattooing and piercing. In their review, Moazen et al. (14) considered what is known about the prevalence of these BBV risk behaviors among prisoners globally. Across 53 countries, they observed a high prevalence of BBV risk behaviors in prison, with marked heterogeneity in estimates only partially explained by regional differences. The public health implications of these findings are clear: Prisons are critical sites for identifying and treating BBVs and for minimizing the spread of infection through implementation of evidence-based infection-control measures. Consistent with this, the authors recommended widespread adoption of the World Health Organization comprehensive package (15) of interventions for the prevention of HIV and related infections in prison. Assessing the uptake of this package at the global level is an important priority for future research.

A large proportion of people in prison have a history of injection drug use. Although some people stop injecting while in custody, others continue, and even though they typically do so at a lower frequency, each injection episode is high risk (16) because of the lack of access to clean injecting equipment in most prisons (17, 18). Lazarus et al. (19) reviewed what is known about the impacts of prison needle and syringe programs (PNSPs) on health outcomes for clients of these programs. Despite sustained and widespread advocacy for PNSPs (20, 21), they identified only 5 eligible studies and rated the strength of evidence as low, although suggestive of benefits for the prevention of HIV and HCV. Importantly, the authors highlighted that although evidence with respect to staff safety is limited, there were no reports of needles being used as a weapon against staff in prisons with a PNSP. Given the strong evidence for the benefits of needle and syringe programs in the community (22–24), the authors called for wider adoption of PNSPs.

Most people in prison return to the community after a relatively short period. A lack of indicated prevention for infectious disease transmission in prison therefore has public health consequences that extend beyond the prison environment. Ndeffo-Mbah et al. (25) reviewed studies using dynamic transmission models of infectious disease in correctional settings. They found that fewer than 1 in 3 studies considered the consequences of disease transmission in prison on the general community. Importantly, they found that opioid agonist treatment in prison reduced HIV infection, although treatment will have less benefit in countries in which the principal drug of concern in prison entrants is methamphetamine, such as Australia (26). Only 1 of the studies included validation of model projections against empirical

data, and almost all models were fitted using a single data point estimate of disease prevalence. The authors called for more longitudinal data with repeated measures of disease prevalence, risk behaviors, and treatment at multiple time points during and after incarceration. Taken together, the findings highlight the critical role of prisons in infection control among people who inject drugs at the population level.

Incarceration represents an important opportunity to identify and initiate treatment for infectious diseases (7). Realizing this important public health opportunity is contingent on reliably identifying those with infections. In their review of active case finding for infectious diseases in prisons, Tavošchi et al. (27) found evidence that both testing at prison reception and provider-initiated testing in prison were associated with higher uptake of testing. However, the proportion of prisoners undergoing testing varied markedly between studies, and the methodological quality of most included studies was rated as very poor. Effective case finding to permit scale-up of treatments is critical, especially for the highly efficacious and well-tolerated direct-acting antiviral treatments for HCV infection (28, 29). The findings of this review highlight the need for rigorous evaluation studies to inform implementation of effective, ethical, and cost-effective methods of active case finding in prison settings.

Among prisoners, certain groups such as people who inject drugs, men who have sex with men, sex workers, and transgender individuals have a higher risk of poor health outcomes. Wirtz et al. (30) reviewed what is known about the prevalence of HIV, HCV, and hepatitis B among these key populations in prison. Most included studies comprised people who inject drugs or men who have sex with men. Meta-analysis of data from 29 countries indicated a higher prevalence of infection among key populations than among their corresponding “non-key” prisoner counterparts. The authors observed that few of the included studies reported implementation of prevention efforts (i.e., opioid agonist treatment, PNSP, HIV/sexually transmitted infection screening) where infection was detected and argued that evidence-based prevention programs are particularly important for key populations in prisons. Consistent with Moazen et al. (14), they also asserted the importance of collecting data on the coverage of prevention efforts in prison settings.

Effective, indicated prevention requires a nuanced understanding of the risk factors, barriers to treatment, and structural determinants that adversely affect the health of key populations. Poteat et al. (31) reviewed what is known about the epidemiology of infectious diseases in incarcerated transgender people. They found that comparatively few studies included prevalence estimates for incarcerated transgender people and that most of these were characterized by small samples and often relied on self-reported infection, which is known to markedly underascertain infection in prison (32). The prevalence estimates in the included studies were high, although none compared these estimates to those among nontransgender counterparts. The authors also found that individuals assigned to sex-specific prisons based on birth-assigned sex rather than gender identity appeared to be at increased risk of violent victimization. Accordingly, they recommended that information on both assigned sex at birth and gender identity be collected routinely and called for a human rights-informed approach to care for transgender people in the criminal justice system.

## SUBSTANCE USE AND MENTAL HEALTH

Despite widespread recognition that exclusive reliance on supply reduction is ineffective in regulating illicit drug markets (33, 34) and that prisons concentrate people who are substance dependent, supply reduction is the predominant method of substance use control in prison settings. Mundt et al. (35) reviewed the prevalence of substance use in unselected, representative samples of prisoners in low- and middle-income countries (LMICs). Despite marked heterogeneity in prevalence estimates, which was partially explained by regional differences, they generated random effects pooled-prevalence estimates of 56% for tobacco smoking, 16% for alcohol use, 25% for illicit drug use, and 1.6% for injection drug use. As in the community, it is abundantly clear that zero-tolerance responses to substance use in prison are ineffective. Accordingly, in addition to targeted responses for people who inject drugs in prison, the authors call for evidence-based alcohol treatments and argue that prison smoking bans, detoxification, and addiction treatment services “have the potential to address the large burdens of smoking and substance use in LMICs” (35, p. 70).

Tobacco smoking is an important cause of morbidity and mortality in people who are incarcerated. Spaulding et al. (36) reviewed articles across 50 countries and found that the prevalence of tobacco smoking in prison is between 1.04 and 62.6 times higher in prison than in the surrounding community. Based on a conservative estimate of a 2-fold higher prevalence of smoking in prisoners, they extrapolated that almost 15 million smokers pass through prisons globally each year. However, their estimate relied on a very uncertain estimate of global prison throughput (2), illustrating the importance of accurate global prison throughput estimates. Nevertheless, noting that many prisoners expressed a desire to quit smoking and that prison smoking bans alone have a negligible impact on smoking after release from prison (37), they called for the adoption of evidence-based smoking cessation interventions in prison and, crucially, after release from prison.

Incarceration presents an opportunity to initiate treatment for substance use in a population who often do not seek help in the community. De Andrade et al. (38) examined the associations of prison-based (psychological and pharmacological) drug and alcohol interventions with substance use and recidivism outcomes after release from prison. Of the 49 included studies, only 6 were rated as methodologically strong, and almost half ( $n = 23$ ) were rated as weak. On the basis of this evidence, they found that both opioid agonist treatment and therapeutic communities reduce substance use and recidivism and that, consistent with the findings from an earlier review (39), continued treatment after release from prison enhances treatment effects. Cognitive behavioral therapy is a core component of drug treatment in many prison settings (40–42); however, although therapeutic communities were found to reduce recidivism in 10 out of 11 included studies, there was no observed association between cognitive behavioral therapy and recidivism, and a reduction in substance use after release from prison was observed in only 1 of 6 studies on cognitive behavioral therapy (an uncontrolled cohort study). There is clearly more work to be done to ensure that substance use treatment in prison aligns with the evidence.

Experiences of trauma are common among people who experience incarceration (43, 44). Baranyi et al. (45) conducted

meta-analyses of the estimates of the prevalence of posttraumatic stress disorder in unselected prison populations from 20 countries. The pooled point prevalence rates were 6.2% for males and 21.1% for females (approximately 5 and 8 times higher for males and females, respectively, compared with the general population). Although heterogeneity was high, the authors’ findings confirm that posttraumatic stress disorder is a common mental health problem for people who experience incarceration. These findings further emphasize the particular mental health vulnerability of incarcerated women and the need for trauma-informed care in correctional settings.

## AN AGING POPULATION

Prisoners are on average younger than the surrounding population; however, older people are one of the fastest growing demographics in many prison systems (46), notably including in the United States (47). This makes it challenging for service providers to fund and deliver appropriate health care. Skarupski et al. (48) synthesized the current literature on the health of older prisoners in the United States. They identified 21 studies, and not surprisingly, they found that this population had higher rates of chronic physical conditions than did their younger counterparts and that a substantial proportion (20%) of older prisoners in the United States reported limitations in daily activities. The authors also noted a striking absence of evidence on the cognitive functioning of older prisoners.

## THE CYCLE OF DISADVANTAGE

Wildeman et al. (49) reviewed the evidence regarding the relationship between parental incarceration and child health and well-being. To permit estimation of causal effects, they restricted their review to higher-quality studies. They found evidence that parental incarceration is associated with poor physical health outcomes (prenatal health, self-reported health, obesity, and mortality), poor mental health, behavioral problems, school disengagement and out-of-home care, risky behavior, and contact with the criminal justice system. The authors also identified some important moderators of this association, including domestic violence, a conviction for violent crimes, and propensity for the parent to experience incarceration. They hypothesized that these factors may be markers of violent/abusive behavior at home, whereby the incarceration of a parent with these characteristics may have a beneficial impact on child health and well-being. Additionally, they found that the evidence for a negative association between maternal incarceration and child outcomes is mixed, such that further research on the impact of maternal incarceration is urgently required. Irrespective of the mechanisms and debates about causality, mass incarceration appears to be an important driver of health inequalities in children, at least in the United States.

## RECURRING THEMES, EVIDENCE GAPS, AND A WAY FORWARD

The included reviews cover a diversity of health issues, but there are some recurring themes. One is that, particularly in countries with a high incarceration rate, the health of people who cycle

through prisons can have significant implications for the health of communities, child health, health equity, and even global health: in other words, that prisoner health is public health (12). This reality is perhaps most clearly illustrated by Ndeffo-Mbah et al. (25) who, consistent with the findings of another recent review (34), concluded that lower incarceration rates would reduce HIV, HCV, and tuberculosis prevalence at the population level. The health of people in prison is rarely high on the political agenda, and investment in prison health research has to date been inadequate (50, 51); however, as the reviews in this special issue show, prisoner health is an important component of public health.

Another recurring theme relates to the mismatch between evidence and policy. Despite a high prevalence of BBV risk behaviors in prison (14), highlighted by Lazarus et al. (19), coverage of evidence-based infection-control measures in these settings is inadequate, even in countries in which such measures are available in the community (19). Similarly, although an estimated 15 million tobacco smokers cycle through prisons each year (36), the introduction of prison smoking bans remains the only substantive effort to reduce smoking in this population. Without continued support after release, these bans will have a negligible net effect on smoking behavior or harms (37). Despite very little evidence that cognitive behavioral therapy-based drug treatment programs reduce drug use or recidivism after release from prison (38), these programs remain central to offender rehabilitation (40–42). By contrast, although continued support after release from prison seems to potentiate the effects of evidence-based drug treatment (38), investment in this sort of aftercare remains minimal in most settings.

The included reviews also identified some critical evidence gaps. Perhaps the most pronounced is that although more than two-thirds of the global prison population resides in LMICs (52), the vast majority of studies have been conducted in high-income countries. We do not yet have a truly “global” evidence base regarding the health of people who experience incarceration. For example, Wirtz et al. (30) highlighted an almost complete lack of evidence on BBVs in key populations from low-income countries, including those in Eastern Europe and Central Asia. The importance of country- and region-specific evidence is illustrated by Mundt et al. (35), who observed important regional differences in patterns of substance use in prison in LMICs. A lack of evidence specific to these settings and to key populations in these settings precludes the development of tailored interventions. Critical to redressing this imbalance will be the development of in-country research capacity, as well as funding streams that transcend traditional national silos to support prison health research, in LMICs.

The prevalence of HIV is elevated in prisons. Regional estimates range from 1.3% to 15.6% globally, and in North America the pooled prevalence estimate is 1.3% (95% confidence interval: 1.0, 1.7) (7). HIV is a critical health issue for this population; however, the concentration of research funding devoted to HIV—64% of National Institutes of Health funding for criminal justice research in the United States (51)—is arguably disproportionate. Reflecting this, half of the reviews in this special issue were focused on either the prevalence of or means for preventing HIV and related infections in prison. Fewer studies have been focused on other highly prevalent health problems in this population, such as substance dependence, mental disorders, or cognitive disabilities. Furthermore, despite the fact that complex, comorbid

health problems appear normative in this population (53, 54), there has been insufficient focus on health outcomes related to their co-occurrence.

Prisons are in many ways a microcosm of the surrounding community, and this heterogeneity necessitates a targeted (vs. one-size-fits-all) approach to health service delivery. As such, another limitation of the literature is the lack of evidence regarding the health of important subpopulations in prison, such as women (55–59), young adults (60), lesbian, gay, bisexual, transgender, and queer people (collectively referred to as the LGBTQ community) (30, 31), and racial/ethnic minorities (11, 61). The reviews by Wirtz et al. (30) and Poteat et al. (31) are an important step toward building an evidence base regarding the health of incarcerated LGBTQ people, men who have sex with men, people who inject drugs, and sex workers; however, as the authors’ findings highlight, much work remains to be done with these and other minority populations in prison. In their review, Skarupski et al. (48) also highlighted that, despite an aging prison population and evidence that prisoners age more quickly than do their community counterparts (62), not enough is known about the prevalence, prevention, or treatment of noncommunicable diseases in prison (8) or the health and medical costs associated with aging prison populations (46).

Remarkably, none of the reviews included in this special issue were focused on detained adolescents. The lack of evidence on the health of detained adolescents, particularly in LMICs, is a critical gap in the literature. Despite a high prevalence of complex health problems among young people in detention (63–66) and growing evidence of higher mortality rates after release from juvenile detention (67–69), there have been comparatively few studies of the health of this population, particularly outside of the United States, and even fewer of their health outcomes after release from detention. Given the growing global recognition of the importance of data on vulnerable youth (including those involved in the justice system) to inform measurement against the sustainable development goals (70), further research with this population should be a high priority.

Many of the contributors to this series drew attention to the importance of considering health outcomes and trajectories after release from prison. In this regard, another critical limitation of the literature is the limited number of longitudinal studies documenting health outcomes and patterns of health service utilization in people released from prison (25). Retaining people released from prison in survey-based longitudinal studies is notoriously challenging (72), but a methodology that holds promise is data linkage. Administrative data can be a valuable complement to self-reported data in both routine data collection and research, particularly when examining proscribed or stigmatized behaviors (14, 32, 35, 72). Linkage with administrative health data also provides opportunities to accurately document the considerable costs of health care for people released from prison (73), which may assist in health economic analyses and in advocating for investments in primary and preventive health care for this population (74). However, to date, with the notable exception of studies of mortality after release from prison (75–77), there have been surprisingly few studies in which investigators have used data linkage to examine health outcomes after release from prison and fewer still in which they have combined administrative data with data from other sources, such as surveys or clinical information.

In a number of reviews, the authors commented on the low quality of the included studies. Rigorous research in correctional

settings can be challenging, but it is not impossible and is critical to ensuring that prison health care is informed by sound evidence. However, randomized controlled trials in prison settings are a rarity: In a recent global systematic review, Kouyoumdijan et al. (78) identified only 95 randomized controlled trials with a health outcome in prison settings, and a health outcome after release from prison was measured in only 42 of these. Developing and implementing randomized controlled trials in prison settings requires careful attention to ethical and methodological issues, but these issues are resolvable (78). People in prison are entitled to the same standard of health care as are those in the community (79), and this extends to health research in these settings. Compromising on the methodological rigor of health research in prison settings risks devaluing the health of people who experience incarceration—a passive form of discrimination that is symptomatic of the so-called “soft bigotry of low expectations.”

For researchers interested in the health of people in prison, a perennial challenge is the reluctance of many correctional authorities to participate in rigorous, independent research and to have the findings of this research made publicly available, irrespective of the findings—a kind of “epistemophobia.” Researchers interested in the health of incarcerated people must build effective partnerships with correctional administrators based on mutual understanding and respect. A related barrier, sometimes imposed by well-meaning ethics committees, is the somewhat paternalistic and avoidable exclusion of people in prison from research on ethical grounds (80). People who cycle through prisons are entitled to special protections given their vulnerability but are also entitled to participate in research, to protect their right to self-determination, and to benefit from high-quality evidence to inform their health care (81).

A final challenge for the field is the somewhat myopic focus of some correctional authorities, as well as some researchers, on re-offending outcomes after release from prison. Despite compelling evidence that incarceration is related to structural disadvantage (11), the social determinants of health (11), complex health problems (82), and a lack of access to affordable health care (83, 84), the focus of most correctional systems has traditionally been on reducing rates of re-offending. Although preventing re-offending is clearly important, so too is maximizing health outcomes for vulnerable members of the community, irrespective of incarceration history (79, 85). Yet, investment in efforts to improve health outcomes after release from prison has been modest in most settings. This insidious yet pervasive devaluing of health outcomes for people who experience incarceration—a form of “criminocentrism”—is a critical barrier to re-imagining prisons as the public health opportunities that they need to be.

## CONCLUSION

The value of systematic reviews is constrained by the quality of the primary studies on which they are based. Despite a rapidly growing literature on the health of people who experience incarceration, there is much work still to be done. Some critical health issues are poorly understood, and there has been insufficient attention devoted to co-occurring health conditions and the consequent need for coordinated care. Key populations in prisons remain understudied, limiting the capacity to develop targeted, evidence-based responses to their health needs. The quality of many studies is suboptimal, and although rigorous, independent

research in correctional settings can be challenging, it is not impossible and is critical to laying the groundwork for evidence-based reform. The literature has focused heavily on describing health problems, but not enough is known about the prison health systems that are charged with meeting the complex health needs of this population. Accurate data on national, regional, and global prison throughput are urgently needed to permit accurate estimation of the health burden in these settings; health economic studies will be critical to making the case for scalable responses to addressing this burden. It is time to move beyond “hand-wringing epidemiology” to more sophisticated epidemiologic and longitudinal studies that can identify modifiable risk and protective factors for poor health outcomes in and after release from prison, and rigorous evaluation research—including randomized controlled trials—to identify effective, scalable ways of improving these outcomes. People who experience incarceration are among the most vulnerable members of our communities. Improving their health outcomes is central to reducing health inequalities and to improving public health.

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